

GOVERNMENT OF MADHYA PRADESH
FOREST DEPARTMENT



FAMILIES

Linaceae, Malpighiaceae, Zygophyllaceae, Geraniaceae,
Balsaminaceae, Oxalidaceae, Rutaceae,
Simaroubaceae, Uchnaceae,
Burseraceae

IN

MADHYA PRADESH

BY

P. C. KOTWAL, M. Sc. Ph D.

FOREST BOTANIST

Issued by—

THE BOTANY BRANCH

State Forest Research Institute

JABALPUR (M. P.)

1974-75

GOVERNMENT OF MADHYA PRADESH

FOREST DEPARTMENT

FAMILIES

LINACEAE, MALPIGNIACEAE, ZYGOPHYLLACEAE, GERANIACEAE,

BALSAMINACEAE, URBALIDACEAE, RUTACEAE,

SIMARUBACEAE, URBALACEAE,

URBALACEAE

IN

MADHYA PRADESH

BY

P. C. KOTALL, M. Sc., Ph. D.

FOREST BOTANIST

Issued by

THE BOTANY BRANCH

STATE FOREST RESEARCH INSTITUTE

JABALPUR, M.P.

1974-75.

LINACEAE

Herbs or shrubs, leaves alternate simple, usually entire, stipules lateral, intrapetiolar or 0. Inflorescence various, normally racemose. Flowers regular, bisexual. Sepals and petals 5 each, petals blue, yellow or white, soon perishing. Stamens 5, with equal or more number of staminodes, united at base into a ring, glands 5, adnate to staminal tube or 0. Ovary 3-5 celled entire, ovules 1-2 in each cell. Style 3-5, free or jointed. Fruit capsular, dehiscence through all 3-5 septa, seeds 1-2 in each, compressed,

Key to the genera :

Herbs.	-----	<u>Linum</u>
Erect undershrub	-----	<u>Reinwardtia</u>

Linum Linn.

Key to the Species:

Flowers large 2.5 cm. diam., blue.	<u>L. usitatissimum</u>
Flowers small 0.8 cm. diam., yellow.	<u>L. mysorense</u>

Linum usitatissimum Linn. F.B.I. 1: 410.

Annual erect herb 30-60 cm. high. Leaves up to 3 cm. long linear, lanceolate, 3-nerved at base. Flowers blue 2-2.5 cm. diam blue, in Corymbose panicles. Sepals 5-three nerved. Capsule mucronate, as long as the sepals. Seeds compressed, shining, dark brown.

Cultivated during winter for the oil which is obtained from seeds.

Local : Alsi.

Fl. and Fr. :- Jan- March

Collected from: Rajnandgaon (Khotale 3275),
 Amarkantak (Saxena 2936),
 Jabalpur (Indorkar 4138),
 Chanderi (Shukla 12581).

Linum mysorense Heyne F.B.I. 1; 411.

Erect annual ^{herb} 15-45 cm. high, glabrous. Leaves sessile, 1-2 cm. long, ob-ovate, mucronate, tapering at base, 3-nerved, Flowers 0.8 cm. diam, yellow, on corymbose panicles. Pedicels short. Sepals 3-nerved, 5, petals twice the length of sepals. Ovary glabrous. Capsule globose, apiculate surrounded by Persistent sepals. Seeds 10, compressed smooth.

Occurs in moist localities.

Local : Alsi (Patalkot).

Fl. and Fr. Sept - Oct.

Collected from : Pachmari (Saxena and Khotele 8132, 7936,
.....), Patalkot (Shakla 9636)

Reinwardtia Dumost.

Reinwardtia indica, Dumost. Syn, Reinwardtia trigyna,
Planch. F.D.I. 1; 412.

A branched, glabrous, undershrub about 1 m. high.

Leaves alternate, elliptic-lanceolate, acute, almost entire,
5-10 cm. long narrowed into petiole. Flowers yellow 2.5-3.7 cm.
broad
..... on many axillary branchlets. Stamens 5, dimorphic. Styles
3, sometimes 4-5, free or connate at base. Capsule globose,
shorter than sepals. Collett (1884) differentiated eight
forms based on length of stamens and styles.

Frequent in moist forests, specially in vallies.

Fl. and Fr. Sept - Nov.

Collected from : Amdol (Saxena 4678), Bastar (Singh 4274)
Amarkantak (Khotele 10046,
Indorkar 10932).

.....

MALFIGHIACEAE

Climbing shrubs. Leaves opposite, entire. Stipules small or 0. Flowers arranged in axillary or terminal racemes, pedicels joined. Flowers moderate sized, white or yellow. Calyx lobes 5, with a gland on some lobes. Petals 5. Disc obscure. Stamens 10, one or more, often larger than others, sometimes connate below. Ovary 3-celled, ovules single in each cell, styles 1-3. Fruit of One or more. Winged samaras. Seeds ex-albuninous.

Key to the genera.:

Sub erect. Flowers medium sized, irregular

Style 1, Calycine gland large.

Hiptage.

Scandent. Flowers rather small, regular

Styles 3, Calycine gland 0.

Aspidopterys.

Hiptage, Gaertn.

Hiptage bengalensis (Linn) Kurz

Syn. Hiptage madablota Gaertn. F.B.I. 1; 418

A large woody much branched climbing shrub. Leaves Coriaceous, elliptic-oblong, shortly acuminate, 10-15 cm. long. Secondary nerves 4-6 on either side. Petiole small. Flowers in tomentose racemes, white fragrant, 1-2 cm. broad. Calyx persistent, pubescent. Petals clawed and finbriate. Carpels with a 2.5-3.5 cm. long central wing and 2 cm. long lateral wings, on either side. Seed solitary globose.

In moist forests chiefly along nales and ravines.

Local : Rewti (Bastar).

Fl. and Fr.

March - April.

Collected from:-

Chanderi (Shrivastava 12703),

Bastar (Saxena 5672, 1842).

Aspidopterys A. Juss

Aspidopterys indica, Hochreut. F.B.I. 1; 420.

A rather slender but woody climber. Leaves shining, broadly ovate, shortly acuminate 10-18 cm. long. Flowers in large rusty tomentose axillary and terminal panicles, small 0.4 cm. diam. white. Pedicels jointed. Calyx persistent. Fruit samaroid with linearoblong 2.5-5 cm. long membranous, glabrous wings.

Fl. and Fr.

Sept. (Panigrahi et al 1963) reported From Dantewada, Bastar)

LYGOPHYLLACEAE

Herbaceous Plants with Pari-pinnate leaves, stipulate.
Branches usually jointed. Flowers axillary, solitary, bisexual. Calyx, corolla five each. Stamens 2 or 3 times more. Ovary 4-5 celled usually angled. Fruit Capsular or of Cocci.
Key to the genera :

Prostrate herb. Fruit spiny. Tribulus.

Erect herb. Fruit globose. Peganum

TRIBULUS LINN
Tribulus terrestris Linn. F.B.I. 1; 423

Procumbent herb. Stems, branches and leaves hairy.
Leaves paripinnate, leaflets 5-7 pairs. Flowers yellow, 0.7-1.5 cm. diam. Fruits schizocarpic, breaking into 4-6 cocci, each coccus ^{with} two, sharp divaricate spines.

Common on road sides and grasslands during rainy season.

Local : Gokhru.

Fl. and Fr. :- Sept - Dec,

Collected from : Sheopur (Khotela 14399), Ajaypur (Khotela 13339), Jabalpur (Indorkar 13728), Indore (Gupta).

Peganum, L

Peganum harmala Linn F.B.I. 1; 436.

A pretty bush 0.3-1 m. high, densely dichotomously branched. Leaves multifid, segments linear, acute, 2 cm long. Flowers white 1 cm diam. on leaf - opposed peduncles. Sepals linear, exceeding the petals. Capsule globose 1 cm diam.

Fls. :- April

Indore (Gupta No. Nil)

GERANIACEAE

Herbs, undershrubs. Leaves opposite or alternate usually with two stipules. Peduncles axillary, flowers in racemes complete. Sepals and petals 5 or 4 each. Ovary 3-5 celled. Fruit capsular 3-5 lobed, lobes 1-2 seeded, often separating from the axis.

Key to the genera :

Fruits dehiscent, beaked, seeds in pairs. Geranium
 Fruits indehiscent not beaked, seeds solitary. Biebersteinia.

Geranium, L. F.B.I.
Geranium ocellatum Camb. 1; 433.

A small annual herb with a short rather woody stem, hairy and branched, often clothed with persistent leaf stipules. Leaves tufted, long petioled, orbicular, palmately lobed 2.5-3.7 cm. diam. Flowers on axillary peduncle, rose coloured, with a purple eye, 1-2 cm. broad.

The long tufted leaf petioles look like several branches. Fruits corrugate, seeds smooth.

Fl. and Fr. :- Sept. - Jan.

Collected from : Amarkantak (Saxena 4626, 4738),
 Patalkot (Shukla 13010, 9715).

Biebersteinia Stephan.

Biebersteinia enodi Joub & Spach. F.B.I. : 427.

A tufted, branched, glandular, pubescent, annual herb. leaves pinnatisect, lobes pinnatifid. Stipules adnate, cut into many lobes. Flowers in racemes, 1.2 cm. diam., yellow.

In general the plant gives a look of roseaceous plant,

potentilla Rare. Along Canal bank. Fl. & Fr. Rainy season
 Collected from : Sheopur (Khotale 14340).

BALSAMINACEAE

Herbs. Leaves alternate, rarely opposite or whorled, exstipulate. Flowers brilliantly coloured, in racemes or axillary. Sepals 3, imbricate, the large posterior, is petaloid and always spurred. Petals 5. Stamens 5, filaments short, anthers connate, which are hooded over the stigma. Ovary 5-celled, each with 2 or more ovules. Fruit a succulent Capsule, elastically opening upwards by 5 valves.

Impatiens Linn

Key to the Species :

Leaves alternate. Flowers 2 cm. diam I. balsamina.

Leaves opposite, Flowers 0.4 cm. diam wings with claws. I. kleinia

Impatiens balsamina Linn. F.D.I. 1; 453.

An annual erect herb about 0.5-m. high, glabrous, rather fleshy. Leaves alternate, elliptic-lanceolate, acuminate, serrate with glandular petiole. Flowers variously coloured, in racemes, or in axillary clusters. Flowers about 3 cm. diam. Sepals 3, with a spur. Capsule tomentose about 2 cm. long with many seeds.

Common in waste grounds and in open places in forests during the rainy season.

English Balsam.

Local :- Poraiya (Pachnari), Tiari (Amarkantak)

Fl. and Fr. :- Aug. - Nov.

Collected from :

Pachnari (Singh and Rajput 17253, Saxena 19529), Bastar (Khotela 8004, Khotela and Shukla 6430), Amarkantak (Indorkar 11139, Saxena 384), Jabalpur (Saxena 182), Indore (Pande

Impatiens kleinia Wight & Arn. F.B.I. 1; 445.

A slender, branched annual, 15-30 cm. high. Leaves opposite, usually petaloid, elliptic lanceolate acute, 2.5-3 cm. long, distantly serrulate, hairy on veins, glabrous and glaucous beneath, base narrowed into a petiole. Flowers pink, axillary, very small, 0.4 cm. diam. Sepals linear, standard orbicular, wings clawed, obovate. Spur slender, longer than the flower. Capsule narrow about 1.2 cm long, fusiform. Seeds few.

Fl. :- Aug.

Not common

Collected from : Bailadila (Khotela 8058) 3¹s par (Khotela 8028)

OXALIDACEAE

Herbs or shrubs. Leaves compound, usually 2-stipulate. Flowers bisexual, regular, axillary solitary or fasciated. Sepals 5, imbricate. Petals 5 or 6. Glands absent. Stamens as many as or double or triple the sepals or fewer by suppression. Filaments connate into a ring. Ovary 3-5 celled, erect with two or more ovules. Fruit capsular and lobed, each with two or more seeds and separating from the axis.

Key to the genera :

Herbs. Fruit capsular.

Leaves 3-foliolate, capsule valves attached to the ~~axis~~ axis. Oxalis

Leaves pinnate, capsule valves detached to the ~~axis~~ axis. Biophytum

Trees or shrubs. Fruit berry.

Leaves pinnate.

Averrhoa

Oxalis Linn.

Key to the species :

Flowers yellow, leaflets obovate. O. corniculata

Flowers bluish purple, leaflets broadly triangular. O. latifolia

Oxalis corniculata Linn. F.S.I.1;436.

A slender herb with tuberous roots, subterranean stems and ascending shoots. Leaves digitately 3-foliolate, 2-3 cm. broad leaflets obovate. Stipules oblong. Petioles 3-5 cm. long, slender. Flowers yellow, 0.5-1 cm. diam. on two flowered axillary peduncles. Capsule subcylindric, 2 cm. or more long. Seeds deep brown, rugose.

Common throughout the state in waste lands, particularly in moist and shady places. Leaves sour.

Local : Timpatiya, Aurai (Indore, Amarkantak), Aurai (Chambhari (Pachhari), Chatakhatia (Patalkot).

Fl. & Fr. Sept. - March.

Collected from : Amarkantak (Shrivastava 17460, Saxena 5842, Sharma 2610, Motels 5172, Indorekar 11153), Bastar (5271), Guna (Shrivastava 14301), Indore (Pandey), Jabalpur (Saxena 13768), Pachhari (Saxena 517) 19541), Patalkot (Sharma 5512).

Oxalis latifolia Linn. A.D. Gen. and Sp. 3,237, t. 467, 1821.

Similar to the preceding species, except the leaves, which are comparatively big, leaflets more divergent, triangular being broad, tapering towards the ends.

Local : Anantnagar (Patalakot).

Fl. April.

Collected from: Anantnagar (Motele 6890), Patalakot (Shukla 9426)
Biophytum DC.

Key to the species:

Sepals longer than the pedicels and fruits.

Leaflets 8-14 pairs, pedicels distinct. B. sensitivum

Leaflets 5-7 pairs, flowers subsessile. B. apocissias

Sepals shorter than the pedicels. B. reinwardtii

Biophytum sensitivum DC. F.S.I.1;436.

A pretty small herb about 10-15 cm. high. The pinnate leaves and long flowering peduncles arise at the apex of the stem forming a sort of crown. Leaflets 8-14 pairs, 0.5-0.8 cm. long. Peduncles hairy, bearing yellow flowers in umbellate cymes. Sepals longer than the pedicels and fruits. Capsule ellipsoid, 5-grooved. Seeds have transverse tubercles.

Common in grasslands. The plant is sensitive to touch.

Local : Lajni (Patalakot), Chotilajwanti.

Fl. & Fr. Sept. - Jan.

Collected from: Gwalior (Kotwal 18647), Jabalpur (Saxena 239),
Patalakot (Shukla 16119), Shivpuri (Shrivastava 16251).

Biophytum apocissias Turcz. F.S.I.1;437.

Similar to preceding species, but very small.

Leaflets 5-7 pairs. Flowers pinkish, nearly sessile. The seeds are said to have scattered tubercles.

Fl. : Sept.

Collected from : Pachmarhi (Saxena 10607).

Biophytum reinwardtii Walp. F.S.I.1;437.

Similar to B. sensitivum in appearance with about 10-20 cm. height and 5-7.5 cm. long leaves. Leaflets 8-12, which are smaller in size towards the base. Bracts and sepals smaller than the pedicels. Flowers yellow. Capsule almost equaling the small sepals.

Local: Chotilajwanti (Guna), Jukku (Bastar), Lajani Badi (Patalakot), Lachkhar (Anantnagar).

Fl. & Fr. Sept. - Dec.

Collected from: Anantnagar (Saxena 10410), Bastar (Singh 18071),
Guna (Shrivastava 11771), Jabalpur (Indrakar 5736),
Pachmarhi (Saxena 1066), Patalakot (Shukla 10603).

Veronica Linn.

Averrhoa carambola Linn. F.S.I.1;439.

A small tree. Bark smooth. Crown dense and dark green. Leaves pinnate, leaflets 2-5 pairs, oblong, ovate, obtuse to acuminate. Basal leaflets small, glabrous, glaucous beneath. Flowers campanulate 6.5 cm. long and broad, pinkish, arranged in pedicels. Fruit 7 cm. long, 5-angled, yellowish.

Planted in gardens for fruits which are sour and used into tarts and preserves or pickled.

Vernacular: Kaurakh.

Fl. June - Sept.

Fr. Sept. - Oct.

Collected from: Govt. garden Tikangara (Singh 1368).

RUFACEAE

Trees or shrubs, abounding in pellucid glands filled with essential oil. Leaves opposite or alternate, simple or compound, exstipulate. Flowers in cymes or panicles, regular, bisexual. Sepals 4-5, connate below. Petals 4-5, hypogynous. Stamens 4-5 or 6-10, filaments free, inserted around a crenate or lobed disc. Ovary 4-5 celled, usually two ovules in each cell, sometimes more. Fruit a capsule, berry or drupe. Seeds usually solitary in the cells.

Key to the genera:

1. Arborescent shrubs or trees.

A. Leaves unifoliate, thorny, pericarp leathery.

i. Petiole often winged.

Citrus

ii. Petiole not winged.

Atalantia

B. Leaves multifoliate, thorny, pericarp woody.

i. Leaflets three.

Aegle

ii. Leaves pinnate, leaflets 3-7, entire.

Feronia

iii. Leaves pinnate, leaflets, 5-7, crenate.

Asperthusa

C. Leaves multifoliate, prickly, pericarp soft.

i. Leaflets 15-21.

Fagaria

2. Unarmed shrubs or trees.

A. Flowers pentamerous to tetramerous.

i. Leaves 1-7 foliate, persistent.

Glycosmis

ii. Leaves 3-25 foliate, deciduous

a. Oblique base.

Murraya

b. Ovate elliptic.

Clausena

3. Herbs.

A. Leaves decoumpund, leaflets small, many.

Ruta

CITRUS Linn.

Key to the species:

1. Young shoots and underside of leaves pubescent.

C. maxima

2. Young shoots usually purplish, petals purplish outside, rind of fruits thick and soft.

A. Leaves highly scented, petiole short, not winged, fruits usually \angle 1 cm. long, oval with an apical projection. The lemon.

C. limon

B. Leaves not highly scented, petioles sometimes with a broad wing, fruits large variable, rind very fragrant. The citron.

~~C. medica~~

C. medica

3. Young shoots green or greenish white, petals pure white, rind of fruits thin.

A. Fruits bright orange coloured, rarely longer than broad.

C. aurantium

B. Fruits green or yellow when ripe, often longer than broad.

..... 11.

- i. Pulp of fruits very acid, aromatic. C. aurantifolia
The sour lime.
- ii. Pulp of fruits sweet, not aromatic. C. limettioides
The sweet lime.

Citrus maxima (Lam.) Merr.

Syn. C. grandis Abba.

C. decana Linn. F.B.I.1;516.

A small tree. Leaves large ovate oblong 15-22 cm. long Petioles broadly winged. Flowers white. Fruits globose or pear shaped, rind thick.

Cultivated in fruit orchards.aines (1916) described the species to be wild in Pachari. Witt(1916) also described C. medica as wild in Pachari hills and Bori.

Citrus limon (Linn.) Lam. of Fl. Ind. 1 73, 1768

Syn. C. medica Var. limon Linn. Sp. Pl. 2;782, 1753

A spiny shrub or small tree. Young shoots purple. Leaves unifoliate, ovate, petioles marginate or winged. Flowers white to pink, in short axillary racemes. Fruits ovoid, yellow when ripe, rind thin.

Cultivated in fruit orchards.

English : Lemon.

Vernacular: nimbu.

Fl. & Fr. : Practically through out the year.

Citrus medica Linn. Linn. Sp. Pl. 782, 1753. F.B.I.1;514.

A shrub or small tree. Young parts glabrous. Leaves oblong, Petioles naked or marginate. Flowers white above, pinkish below. Fruits obovoid, hamillate at the apex, yellow, rind thick.

Cultivated.

English : The citron.

Fl. & Fr.: Greater part of the year (Mansawari 1933).

Citrus aurantium Linn. Sp. Pl. 783, 1753. F.B.I.1;515.

A small tree, much branched from near the ground. Branches usually armed with straight axillary thorns. Twigs are green and angular. Leaves ovate, entire, secondary nerves 17-22 pairs. Flowers white. Fruits globose not hamillate.

Cultivated in gardens and nurseries for its fruits.

Also grows in Amarakantak.

Local : Khatta.

Fr. April - May.

Collected from: Amarakantak, Kapildhara (Knotele 10122),

Buddh Anara (Knotele 5143).

Citrus aurantifolia (Christm.) Swingle. in Journ. Nasa. Ac d. Sci. 3;466;1913.

A shrub or small tree. Leaves elliptic oblong. Petioles winged. Flowers white. Fruits usually small, globose, ovoid, yellow when ripe, smooth, rind thin, tightly attached, pulp acid.

This is included on the authority of Maneswari (1958) who reported it from Kanna.

Vern.: Nagzi Nimba.

Citrus liettoides Tanaka. In C.S.I. 16; 367, 1937.

A shrub. Petioles winged. Flowers small, pale. Fruits globose or ovoid, smooth, thin skinned, pale yellow, pulp sweet.

It is used as stock for grafting loose skinned oranges
Vern. Mitaa Nimbu. oranges

This is included on the authority of Maneswari (1958)
ATALANTIA Corr.

Atalantia monophylla (Roxb.) DC. Prodr. 1-535, F.S.I. 511.

A large thorny shrub or small tree. Bark smooth and brownish. Branches thorny. Twigs pubescent bearing axillary thorns. Leaves simple, coriaceous, thinly pubescent beneath, elliptic lanceolate with emarginate tip and rounded base 3-7 cm. long. Secondary nerves 7-8 pairs. Petioles not winged. Flowers in axillary or subterminal corymbs, white. Ovary 4 celled. Berry globose 2.5 cm. broad, 1-4 seeded.

Along river banks in Sirocha forest, rare (Saines 1916).

Panigrahi et. al. 1965 reported from Jagdalpur, scarce.

Fl. Feb (Panigrahi et. al. 1965). Oct. - Dec. (Saines 1916).

AEGLA Correa.

Aegle marmelos (Linn.) Corre. F.S.I. 516.

A medium sized thorny tree. Bark grey white with longitudinal wrinkles. Branches ascending forming a narrow crown. Thorns 2-4 cm. long, reddish brown, in leaf axils. Leaves 3-foliate, glabrous. Flowers greenish white. Fruits large globose rind woolly, pulp sticky, aromatic, sweet on ripening.

In all divisions chiefly in dry deciduous forests. Also cultivated in gardens. The tree is held secret by the Hindus, for its leaves are offered to Lord Shiva. Fruits useful in digestive ailments. Syrup is also prepared.

Vern. : Bel.

Fl. : March - May.

Fr. : April - Aug.

Collected from: Amarantak (Saxe na & Khotale 5921), Gada (Indorkar 12703), Seoni (Kotwal 19812).

FERONIA Correa.

Feronia limonia (Linn.) Swingle.

..... 13.

Syn. F. elapsatum Correa. F.S.I. 516.

A moderate sized tree. Bark brown grey. Branches spreading. Thorns 2-3 cm. long in axils of leaves. Leaves fasciated, bipinnate. Petiole and rachis often winged. Leaflets 5-7, obovate sweet-smelling. Flowers pale-green. Fruits large, globose, rim woody, rough grey coloured. Seeds embedded in edible pulp which is sour.

In all divisions. Often planted in villages and towns. The acid pulp of fruits is edible and possesses medicinal value.

Vern.: Kaita.

Fl.: April.

Fr.: Ripens and falls Nov. - Feb.

Collected from: Gwalior (Bhattacharya 18528), Chanderi (Sarivastava & Shukla 12251) etc.

HESPERTHUSA Roen.

Hesperthusa crenulata Roen.

Syn. Linonia acidissima Lina. F.S.I.1;507.

Small straight tree or shrub, glabrous and spinous. Branches rigid, flexuous, woody. Spines 1-2, axillary, 1-2 cm. long. Leaves pinnate with winged rachis, leaflets 5-7, elliptic ovate, crenate, 2-4 cm. long. Flowers arranged in short close 1-2.5 cm. long racemes, small, 0.5 cm., pale yellow, 4 merous, fragrant. Ovary 4-celled. Berries black globose, 1 cm. diam. 1-4 seeded, very acid.

Local: Bilsona (Jabalpur)

Fl.: May - June. Subdeciduous at the time of flowering.

Fr.: Nov. - Dec.

Collected from: Dastar, Santewada (Saxena 1213), Gwalior (Khotale 3897), Jabalpur (Inamkar 4107).

FAGARIA Roxb.

Fagaria buxifolia Roxb.

Syn. Lantacoxylum buxifolia DC. F.S.I.1;495.

A moderate sized tree. Bark pale and corky, covered by conical prickles on stem and sometimes also on leaf rachis. Leaves, clustered at the ends of branchlets compound, 25-50 cm. long leaflets about 15-20 ovate, lanceolate shortly acuminate, glabrous, entire, oblique at base, secondary nerves 20-25 pairs. Flowers in large terminal panicles 50 cm. long, yellow, 4-merous, 0.4 cm. diam. Ripe carpels solitary, 0.8 cm. broad and tubercled.

Not common. Only one specimen is presented in the herbarium collected from Kotansar, Dastar.

GLYCOSMIS Coor.

Glycosmis auritica (Lamk) Tardat.

Syn. G. pentanervia DC. F.S.I.1;499

An erect shrub upto 2.5 m. high with stout stem and branches. Leaves 3-5 pinnate, leaflets 10-15, lanceolate, secondary

elliptic, lanceolate entire or obscurely toothed, 5-12 cm. long. Flowers small white in axillary and terminal panicles, pubescent. 3.5 cm. long. Berry 0.7-1.2 cm. depressed globose, often pinkish, one seeded. Buds, flowers and fruits in all stages of maturity are present at the same time.

Common undergrowth in moist forests.

Fl. & Fr.: Practically throughout the year.

Collected from: Pirtagara, Bastar (Saxena 1486).

Murraya Koen. ex. Linn.

Key to the species:

Leaflets aromatic, 11-19, serrate, berries black. M. koenigii

Leaflets not aromatic, 3-9, entire, berries scarlet. M. paniculata

Murraya koenigii (Linn.) Spreng. F.B.I.1;503.

A large deciduous shrub or small tree. Bark grey. Leaves odd-pinnate, leaflets 11-19, oblique, lanceolate 2.5 cm. long, serrate, glabrous, scented. Flowers in terminal corymbose umbels. Young berries shining, pale yellow, later turning black.

Cultivated in gardens for the leaves, which are used in flavouring curries.

Local: Mitna Neen.

Fl. & Fr.: March - May.

Collected from: Amarkantak (Saxena & Khotale 5922), Gwalior (Shrivastava 14655), Jabalpur (Khotale 8919).

Murraya paniculata (Linn.) Jack.

Syn. M. exotica Linn. F.B.I.1;502.

A shrub or small tree with a sombre appearance. Bark smooth, yellowish white. Leaves odd-pinnate, leaflets 3-9, dark green shining, oblong lanceolate, entire. Flowers arranged in panicles, white, fragrant, more so at night, with a fairly strong scent which is similar to orange blossom. Berries ovoid, pointed. 2-seeded, scarlet.

Grows in gardens for its ornamental appearance and also planted as a hedge plant. Also occurs wild in Bori and Pachmari.

Vern. Maana kamini.

Fl. & Fr.: Summer and rainy season.

Collected from: Amarkantak (Saxena & Khotale 5937), Orissa (Shrivastava 14892), Aorighat-Pachmari (Saxena 19608), Pirtagara (Singh 11302).

Clausena Bur. f.

Clausena lansium (Lour.) Skeels.

Syn. C. Wampi Blanco., C. Wampi Oliv, F.B.I.1;505.

An unmarked small tree. Leaves and inflorescence pustular. Leaves oddpinnate, leaflets 5-9, ovate, elliptic, 5-10 cm. long, waved or crenulate. Flowers in compound panicles. Ovary 5-celled. Fruit globose, rind tough, covered with glands of green balsamic oil. Seed solitary.

Cultivated in gardens.

AURA Linn.

Aura graveolens Linn. F. s. i. 1; 485.

An erect herb about 20-30 cm. high. Leaves decouped, petioled, leaflets cuneate, 0.5 cm. long. Flowers in spreading corymbs.

Bracts lanceolate. Sepals 4. Petals 4, obovate, yellow coloured. Capsule shortly pedicelled, obtuse. Seeds angled.

Cultivated for the medicinal uses.

Fl. : Jane

Collected from: Inaore (Saxena 1512), Jabalpur, Sulki (Shukla 16839).

.....

DIKARJACAE

Trees or shrubs. Bark bitter. Leaves alternate, pinnate. Stipules⁰ or deciduous. Flowers small, unisexual or polygamous, rarely bisexual, in axillary cymes or panicles. Calyx 3-5. Petals 5-5 or 0. Discolorate, simple or lobed, stamens equal or twice the number $\frac{1}{2}$ of petals ovary free 2-5 celled and styles free or connate. Ovaies 3ae in each cell. Fruit lobbed samaroid or drup-aceous.

Key to the genera:

- Large trees, leaves pinnate, fruit a samara Ailanthus
- Small thorny trees, leave 2 foliate, fruit Balanitis a drupe.

AILANTHUS Desf.

Ailanthus excelsa Roxb. F.B.I.1;518.

A large tree 20-25 m. high. Bark thick, light coloured. bole straight, cylindrical with a semi circular crown. Branchlet^s/noary tomentose. Leaves large, pinnate, leaflets 10-13 pairs, coarsely toothed. Flowers in panicles, yellowish, foetid smell. Samara 5 by 1.5 cm. strongly veined, blunt or pointed at both the ends, copper red, always once or twice twisted at base.

A beautiful tree, planted. Also occurs in forests, probably introduced.

Vern.: Mananthen, Manaruka.

Fl.: Jan. - March.

Fr.: April - July.

Collected from: Gwalior (Anotele 15334), Indore (Fandey), Jabalpur (Indorkar 4118).

BALANITIS Delile. Non Cons.

Balanitis aegyptiaca (Linn.) Delile.

Syn. B. roxburgii Planch. F.B.I.1;522.

A small sized thorny tree, branching from base to top. Stem pale brown, young branches green and bear axillary straight thorns. Leaves 2-foliate, leaflets 2-4 cm. long, obovate, entire, glabrescent, tapering towards base in a very small petiole. Flowers greenish white, fragrant in close cymes. Drupe oval, 3-5 cm. long, pulp bitter.

Common throughout the state in dry jungles.

Local: Singot, Singan (Gwalior).

Fl.: Feb. - May.

Fr. June - Sept.

Collected from: Gwalior (Anotele 15372, Kotwal 185667, Saxena 10918), Guna (Indorkar 14741), Patankot (Shukla 9128).

UConnACEAE

Trees or shrubs, glabrous. Leaves simple, alternate, stipulate, coriaceous. Flowers usually large, in panicles or umbels. Sepals 4-5, free, persistent. Petals 5, free, deciduous. Disc enlarged after flowering. Stamens 4-8, inserted at the base of the disc. Ovary short and 2-celled, or elongate and 1-10 celled, placentae axile or parietal. Fruit indehiscent, drupaceous or baccate, each 1-4 seeded or capsular.

OCENA Linn.

Key to the species:

Undershrubs, leaves oblanceolate, not papery. O. pusilla

Small trees or shrubs.

Leaves elliptic lanceolate, membranous. O. squarrosa

Leaves coriaceous, glaucous, subsessile, O. gambeli tufted at the ends of branchlets.

Ocena pusilla Lam. F.S.I.1;524.

A perennial undershrub, about 3.4 m. high. Root stock stout, which sprouts annually after the jungle fires. Leaves broadly oblanceolate 7-15 cm. long, spinous-serrate, glabrous.

Petiole short. Flowers in umbels, large and showy, yellow, 4-5 cm. diam. pedicels 2-5 cm. long. Stamens many, anthers longer than the filaments. Style undivided. Drupes ellipsoid, 0.7-1.0 cm., reticately rugose, usually 4-6.

Root, possess medicinal uses.

Fl. : Feb. - June.

Fr. : March - July.

The plant is included on the authority of Panigrahi et al. (1963), who reported it from Bilaspur and Maneswari (1963), who reported it from Raipur.

Ocena squarrosa Linn. F.S.I.1;523.

A sarab or shali tree. Bark smooth, brown. Liane dark pink. Leaves membranous, elliptic or elliptic-lanceolate, 7-1 cm. long, serrate. Secondary veins many. Flowers in short, lateral, corymbose racemes on the old wood, yellow, 2.5 cm. diam. fragrant. Drupes black, ovoid, 1 cm. diam. smooth, surrounded by persistent red sepals.

Fl. : April - May

Fr. : rainy season.

This is included on the authority of Panigrahi et al. (1968) who reported it from Bilaspur.

Ocotea gambieri King et al. Ind. trees 128.

A shali tree with thick bark and resinous wood. Branches stiff, erect. Leaves lustrous, subsessile, elliptic-lanceolate, serrate, coriaceous, glaucous, secondary veins many. Flowers in axillary corymbose racemes on short, woody and leafless branchlets, large, yellow. Petals persistent. Stamens many, inserted round the disc. Drupes globose, lobed with style projecting above, 1-3 seeded.

Fl. : April.

Fr. : June.

Collected from : Bastar, Bailadilla (Khotale 9003),
Bairangara (Khotale 9346).

.....

BOSWELLIACEAE

Trees or shrubs. Juice balsamious, fragrant (oleoresins).
Leaves alternate, imparipinnate or 3-foliate. Flowers in
axillary or terminal racemes or panicles, small, bisexual or
polygamous. Sepals 3-6, often minute, connate below. Petals
3-6. Stamens free, inserted at the base or margin of the disc.
Ovary free, 2-5 celled, each cell two ovules. Fruit arapocous
with 1-6 free or united pyrens, each pyrene one seeded.

Key to the genera:

- 1. Trees, leaves imparipinnate.
 - A. leaflets coarsely crenate, obtuse, glaucous.
Fruit a 3-valved pseudocapsule, pyrenes
separating from the axis. Boswellia
 - B. Leaflets ovate lanceolate, shallow
crenate, acuminate, pubescent, fruit
arapocous with 5 or less hard seeds. Garuga
 - C. Leaflets ovate, entire, a-cuminate,
glabrous, fruit arapocous
globose 1-4 Pyrens. Frotium
 - D. Leaflets oblong, serrate, acuminate,
pubescent on nerves beneath, arapocous
globose 1-3 celled. Sursaria
- 2. Shrubs, leaves 3-foliate. Commiphora

BOSWELLIA Roxb.

Key to the species:

- Leaflets pubescent. B. serrata
- Leaflets glabrous. B. alba

Boswellia serrata Roxb. F.L.I.1;528.

A moderate sized deciduous tree. Bark peeling off in thin
papery flakes of pale greenish colour. Resin oozes out from
cut in the bark. Branches spreading forming flat crown.
Young parts pubescent. Leaves crowded near the ends of
branchlets, about 30 cm. long with 8-16 pairs of subopposite,
sessile, obtuse, crenate pubescent leaflets. Flowers
arranged in axillary racemes, shorter than leaves. Flowers
small, white with saucer like calyx. Arapocous small trigonous.

Common in all divisions. Scarce in Sal forests. Generally associated with Sterculia urens. The wood is valued in paper industry.

Vern.: Salai.

Fl.: Jan. - March.

Fr.: May - June.

Collected from: Amarkantak (Saxena 4765), Guna (Saxena 11784), Gwalior (notwal 18572), Tirtagarn (Saxena 1471)

Roswellia glabra Roxb.

Syn. R. serrata var. glabra F.P.I.1;528.

R. thurijera Colebrooke. Roxb. Fl. Ind. 11,383.

Moderate sized tree. Bark nearly 1.2 cm. thick, juicy when fresh, peeling off in greenish ash coloured, smooth, thin flakes. Leaflets nearly or quite glabrous, often almost entire, lanceolate, obtuse. Racemes usually simple. Drupes oblong-obovoid.

Fl. March - April, when the tree is leafless.

This is included on the authority of Joseph and Vajravelu (1967) from Kari and Subramanyam & Henry (1966) from Bastar.

Garuga Roxb.

Garuga pinnata Roxb. F.P.I.1;528.

A moderate sized tree with straight trunk. Bark light grey, thick with shallow longitudinal wrinkles, exfoliates in broad angular flakes. Inner bark reddish brown. Leaves crowded near the ends of branchlets, imperipinnate, 15-30 cm. long. Leaflets 6-7 pairs, subopposite, ovate, lanceolate, acuminate, oblique, crenate, pubescent. Turn crimson before falling and also due to insect galls. Flowers in axillary panicles, yellow, campanulate. Fruit globose, yellowish-green, 1.7 cm. with 2-4 pyrens.

In all divisions in hilly localities. Reproduces readily from seed and cuttings and coppices well (Witt 1916).

The leaves are frequently attacked by red galls which are conspicuous in autumn.

Vern. : आम्र.

Fl. : March - April, when leafless.

Fr. : May - Aug.

Collected from : Amarkantak (Saxena 3850), Bastar, Dantewada
(Khotale 6037), Patalkot (Saxena 16148).

PROTIA W. & A.

Protium serratum (Wall ex. Colebr.) Engl.

Syn. P. serratum W. & A. F.B.I.1;530.

A tree. Leaves imperipinnate, leaflets 3-7, ovate, entire,
abruptly acuminate, glabrous. Flowers in dichotomously branched
cymes, exceeding the leaves. Flowers, small, polygamous.
Drupes globular, pea sized, subtended by persistent calyx.

Local : Panikusun

Fl. : March.

Fr. : June.

Collected from : Bastar, Dantewada, along nala side (Khotale
6037), Pirtgarh (Saxena 1470).

BURSERIA Linn.

Bursera serrata Colebr. F.B.I.1;530.

A tree. Leaves imperipinnate, leaflets opposite, almost
serrate, oblong, acuminate, pubescent on the nerves beneath.
Flowers in axillary panicles, shorter than leaves. Flowers
very small, yellowish green, bisexual. Drupe globose, 1-3
seeded, 1.2 - 1.7 cm. diam. Pedicels greatly thickened and
elongated.

rare.

Local : Kasim (Budra), Girnar (Amarkantak).

Fl. : March - April.

Fr. : May - June.

Collected from : Amarkantak (Khotale 582), Bastar, Budra
(Saxena 1625).

COMMIPHORA Jacq.

Commiphora mukul, Engle.

Syn. salsanodendron mukul Hook. F.B.I.1;529.

A much branched woody shrub. Lateral branches ending in spines. Bark like that of Boswellia serrata. Leaves at the ends of short woody branchlets. 1-3 foliate, leaflets obovate, glabrous and shining, serrate, lateral leaflets smaller. Flowers small, brownish red in fascicles of 2-3, at the end of branchlets, unisexual. Grape red when ripe, ovoid acuminate, 0.7 cm., separating into two parts, each one celled.

On dry rocky soil in arid regions, Minar, Betul (Witt 1916). Apparently cultivated as a hedge. Exudes gum on incision, which is collected as Gugal.

Vern. : Gugal.

Fl. Feb. - March.

Fr. April - May

Mad & Sastry (1964) reported from Indore.

.....

REFERENCES.

- Wainman, A.E. 1916. Descriptive list of trees, shrubs and economic herbs of the Southern Circle, C. P. Pioneer Press, Allahabad.
- Hooker, J.D. 1875. The Flora of British India. Vol. 1. L. Reeve & Co. London.
- Joseph J. and B. Vajravela. 1937. A contribution to the flora of Khari Reserve Forest, Mandla district, Madhya Pradesh. Bull. Bot. Surv. India 9(194) 17-30.
- Khan, M.A.W. 1973. Madhya Pradesh plants. Govt. Regional Press, Rewa.
- Maheswari, S.A. 1958. The woody plants of Mandwa (Madhya Pradesh). Bull. Bot. Soc. Univ. Sagar. 10; 27-50.
- 1963. A contribution to the flora of Kanha National Park, Madhya Pradesh. Bull. Bot. Surv. India 5(2) 117-140.
- Panigrahi, G., C.M. Prora, S.M. Verma and V.N. Singh, 1966. Contribution to the botany of Madhya Pradesh. Bull. Bot. Surv. India 8(2) 117-125.
- Rao, A.S. and A.S. Sastry. 1964. An account of the flowering plants of Indore district in Madhya Pradesh. Bull. Bot. Surv. India 6; 267-286.
- Subramanyam K. and A.H. Henry. 1966. Vascular plants of Bastar, Madhya Pradesh. Bull. Bot. Surv. India. 8(3 & 4) 207-215.
- Tiwari, S.C.S. 1938. The locations of ornamental and useful trees (Wild and planted) in Madhya Pradesh. Govt. Regional Press, Rewa.
- Witt. D.O. 1916. Descriptive list of trees, shrubs, climbers and economic herbs of Northern and Central Forest Circles, C.P. Pioneer Press, Allahabad.